WHAT IS CLAIMED IS:

1. A fuel cell system having a reformer for generating a reformate gas containing hydrogen from fuel and water/air, a fuel cell stack for generating electric power as a result of supply of reformate gas, a combustor for combusting combustible gas introduced into the combustor, a passage for connecting the reformer and the fuel cell stack, and a passage for connecting the fuel cell stack and the combustor, the fuel cell system comprising:

a recirculation passage connecting the reformer and the combustor so as to allow a flow of the gas discharged from the combustor to the reformer;

a recirculation device for recirculating gas discharged from the combustor through the recirculation passage and the reformer;

a supply device for controlling a supply of fuel and water/air to the reformer;

a device for selecting an operation mode of the fuel cell system from a group including a normal operation mode in which the fuel cell stack performs power generation and a stop mode in which the fuel cell stack does not perform power generation; and

a controller for controlling the supply device and the recirculation device in response to the operation mode of the fuel cell system, the controller functioning to

control the supply device to stop the supply of fuel and water/air to the reformer in the stop mode; and

subsequently control the recirculation device to recirculate the discharged gas from the combustor through the recirculation passage and

the reformer.

2. The fuel cell system as defined in Claim 1, further comprising a circulation control valve for opening and closing the recirculation passage, a discharge line allowing flow of the discharged gas from the combustor to the outside of the combustor and a discharge valve disposed on the discharge line;

wherein the recirculation device comprises a blower disposed in the recirculation passage for generating a flow of the discharged gas from the combustor to the reformer;

and wherein the controller functions to close the discharge valve, open the circulation control valve and operate the blower in the stop mode.

3. The fuel cell system as defined in Claim 1, further comprising a cooler for removing moisture included in the discharged gas from the combustor, the cooler is disposed on the recirculation passage.

4. The fuel cell system as defined in Claim 1, further comprising a sensor for detecting the temperature of the combustor and sending a corresponding signal to the controller;

wherein the controller functions to control the temperature of the combustor to less than a maximum permitted temperature based on the signal from the sensor;

and wherein the combustor transfers the discharged gas to the recirculation passage after combusting at least a portion of the combustible

gas contained in the recirculating gas.

5. The fuel cell system as defined in Claim 4, further comprising an air valve for introducing air into the combustor,

wherein the controller functions to control the opening of the air valve in response to the temperature of the combustor.

6. The fuel cell system as defined in Claim 2, further comprising a sensor for detecting the temperature of the combustor and sending a corresponding signal to the controller and an air valve for introducing air into the combustor,

wherein the controller functions to control the air valve so that air is not introduced into the combustor and stop the action of the blower when the temperature of the combustor starts to fall.

7. The fuel cell system as defined in Claim 2, wherein the controller functions to determine whether or not combustible gas is present in the recirculating gas and stop the blower when it is determined that there is no combustible gas in the recirculation gas.

8. The fuel cell system as defined in Claim 1, wherein

the reformer comprises a carbon monoxide removal section and a reforming section which are supplied air to combust combustible gas contained in the discharged gas from the combustor, and an air valve for regulating the air amount supplied to the carbon monoxide removal section;

the supply device comprises an air valve for regulating the air amount supplied to the reforming section, and

the controller functions to control the air valve for the carbon monoxide removal section and the air valve for the reforming section in the stop mode so that the temperature of the reforming section and the carbon monoxide removal section is smaller than their respective maximum permitted temperatures.

9. The fuel cell system as defined in Claim 1, further comprising a bypass passage for directly transferring gas from the reformer to the combustor by bypassing the fuel cell stack and a directional control valve for selecting the direction of gas flow from the reformer either to the bypass passage or to the fuel cell stack;

wherein, in the stop mode, the controller functions to control the directional control valve so that the gas from the reformer flows to the bypass passage.

10. A control method for controlling a fuel cell system, the fuel cell system having a reformer for generating a reformate gas containing hydrogen from fuel and water/air, a fuel cell stack for generating electric power as a result of supply of reformate gas, a combustor for combusting combustible gas introduced into the combustor, a passage for connecting the reformer and the fuel cell stack, a passage for connecting the fuel cell stack and the combustor, and a recirculation device for recirculating gas discharged from the combustor through the recirculation passage and the reformer,

the method comprising the steps of:

selecting an operation mode of the fuel cell system from a group including a normal operation mode in which the fuel cell stack performs power generation and a stop mode in which the fuel cell stack does not perform power generation; and

stopping the supply of fuel and water/air to the reformer in the stop mode; and subsequently recirculating the discharged gas from the combustor through the recirculation passage and the reformer.

11. A fuel cell system having a reformer for generating a reformate gas containing hydrogen from fuel and water/air, a fuel cell stack for generating electric power as a result of supply of reformate gas, a combustor for combusting combustible gas introduced into the combustor, a passage for connecting the reformer and the fuel cell stack, and a passage for connecting the fuel cell stack and the combustor, the fuel cell system comprising:

means for connecting the reformer and the combustor so as to allow a flow of the gas discharged from the combustor to the reformer;

means for selecting an operation mode of the fuel cell system from a group including a normal operation mode in which the fuel cell stack performs power generation and a stop mode in which the fuel cell stack does not perform power generation;

means for stopping the supply of fuel and water/air to the reformer in the stop mode; and

means for recirculating the discharged gas from the combustor through the reformer in the stop mode.